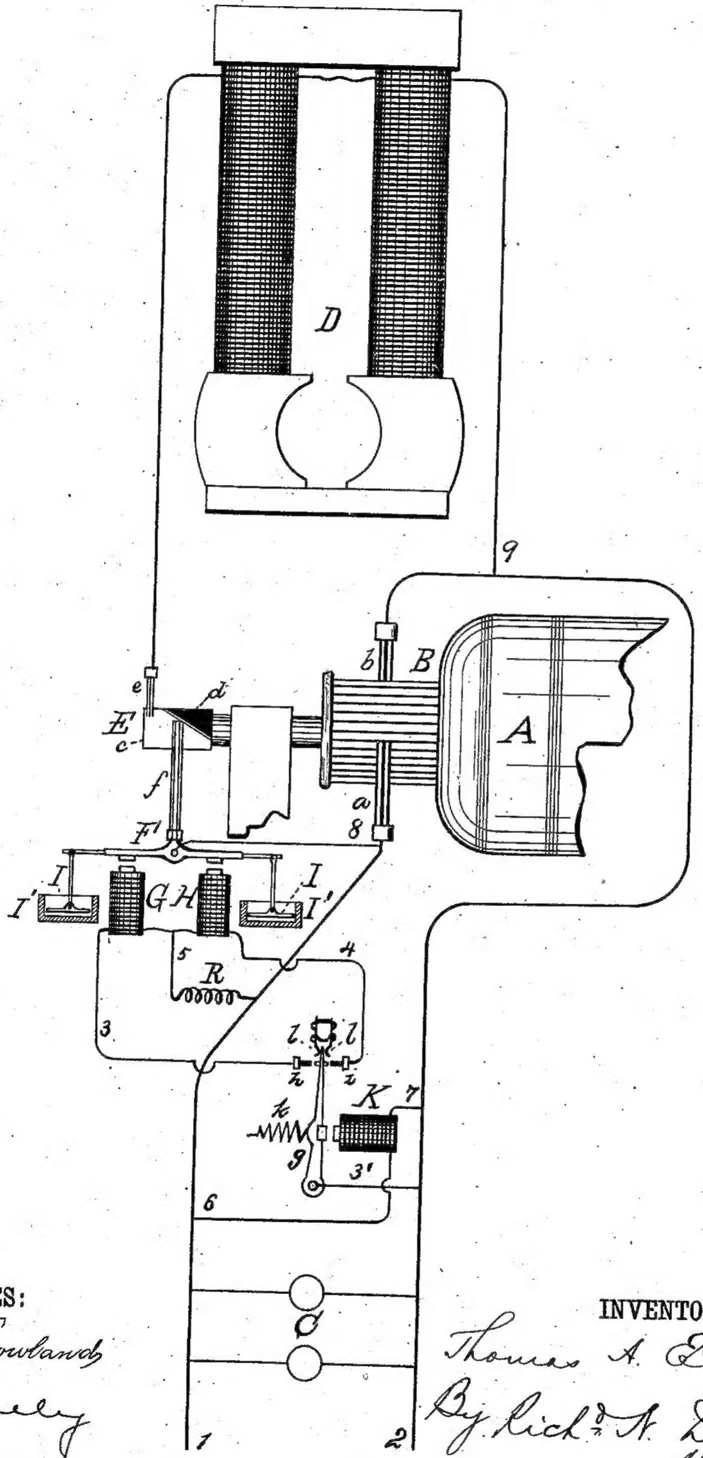
(No Model.)

T. A. EDISON.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 265,783. Patented Oct. 10, 1882.



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REGULATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 265,783, dated October 10, 1882.

Application filed August 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Means for Regulating Electrical Generators, (Case No. 461;) and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The object of the present invention is to produce means for automatically regulating the generative capacity of dynamo or magneto electric machines, which means will be simple and compact in construction, avoiding the use of bulky resistances, and, further, will be efficient in operation, regulating both for changes in the speed of the engine and in the number of translating devices in circuit. The means are applicable more especially to dynamo or magneto electric machines supplying lamps, motors, or other translating devices arranged in independent multiple-arc circuits. The object is accomplished by the use of a peculiar circuit-breaker located in the field-circuit of the machine and controlled by an electro-magnet or other electrical controlling device arranged in multiple-arc and affected the same as the lamps by variations in electro-motive force caused by changes in the speed of the engine as well as by changes in the number of translating devices.

In carrying out the invention there is used a revolving cylindrical circuit-breaker, which is divided up between metal and insulation on a plane arranged obliquely to the axis of rotation, the insulation and metal having a tapering shape. By this construction the circuit-breaking cylinder is made to present in revolving various proportions of insulation and metal at different points of its length. At one end of the cylinder the insulation predominates largely, while toward the other end the insulation regularly diminishes to a point. This end of the cylinder has preferably a band of metal extending entirely around the cylinder, upon which rests a stationary brush or spring. A movable brush is carried by a pivoted bar, and rests upon the circuit-breaking cylinder at points varying from the stationary brush to the other end of the cylinder. This pivoted bar is moved by two electro-magnets arranged on opposite sides of its pivot, and its movement is retarded and made regular by means of one or two reciprocating dash-pot plungers, which are preferably of large area and work against the retarding force of the air. The circuits of these electro-magnets are made and broken at the contacts of the armature-lever of an electro-magnet arranged in multiple arc, or by a thermostatic device, so that the movable brush or spring will be adjusted upon the breaking-cylinder and will keep the field-circuit open more or less of the time, according to whether the electro-motive force is above or below the normal limit.

The foregoing will be better understood by reference to the drawing, which illustrates an apparatus embodying the invention, the armature of the generator being separated from the field-of-force magnet for clearness of illustration.

A is the revolving armature of a dynamo or magneto electric machine, and B the commutator-cylinder of the same, upon which rest the commutator-brushes *a b*, connected with the main conductors 1 2.

C represents lamps, motors, or other translating devices, arranged in separate multiple-arc circuits from 1 2.

D is the field-of-force electro-magnet of the generator.

E is a revolving circuit-breaking cylinder, divided between metal *c* and insulation *d* on a plane oblique to the axis of rotation, the metal and insulation having a tapering form, as shown, and the metal forming a complete band at its large end. This circuit-breaking cylinder may be mounted upon the armature-shaft, as shown, or it may be on a separate shaft worked from any moving part of the generator or engine, or it could be revolved by a small electromotor or by a spring or weight operated mechanism. A stationary brush or spring, *e*, rests upon the band of metal at the end of *c*, while a movable brush, *f*, rests upon the cylinder E, between the brush *e* and the other end of the cylinder. This movable brush *f* is carried by a centrally-pivoted bar, F, the position of which is controlled by two electro-magnets, G H. The bar F is connected with one or more reciprocating dash-pot plungers, I, which are preferably of large area and work against the resisting force of the air in cylinders I', closed at one or both ends. The magnets G H are energized from any suitable source, a multiple-arc circuit from 1 2 being shown as used for the purpose. This circuit is formed of a connection, 3′, running from 2 to an armature-lever, *g*, and from the contacts *h i* of that lever, by wires 3 and 4, to the coils of magnets G and H. The other ends of the coils of G and H are connected together and to a return-wire, 5, running to conductor 1, extra resistance R being preferably employed in the circuit. The armature-lever *g* is retracted by a spring, *k*, and is held in a central position between contacts *h i* by spring-fingers *l*. The electro-magnet K, which attracts *g*, is located in a multiple-arc circuit, 6 7, from 1 2.

The circuit of the field-of-force magnet may be supplied from any suitable source. It is preferably a multiple-arc circuit, 8 9, from 1 2, the brushes or springs *e f* and circuit-breaking cylinder E being included in the circuit. When the electro-motive force is normal, lever *g* will stand in a central position between *h* and *i* and the circuits of magnets G and H will be broken. The bar F will be stationary, and the revolution of the cylinder E will keep the field-circuit open a definite proportion of the time. For convenience of illustration, this may be considered as one-half of the entire time, the brush *f* resting on E at a point where its circumference is divided equally between metal and insulation. Now, if there is an increase of electro-motive force, the lever *g* will make the contact *i*, closing circuit through H and drawing F downwardly on the right of its pivot. The brush F will now rest on E, where the insulation is greater than the metal, and hence the field-circuit will be kept open a greater proportion of the time and the field-magnet will be weakened. If there is a decrease of electro-motive force below the normal, lever *g* will make contact *h* and the circuit of G will be completed, tipping bar F and throwing the movable brush *f* toward *e* to a point on the cylinder E where there is more metal than insulation, and reducing the length of time that the field-circuit is kept open in each revolution of E.

Instead of using the electro-magnet K for controlling G and H, the thermostatic device described in my application No. 460 (Serial No. 69,258) may be employed.

What I claim is—

1. The combination, with a dynamo or magneto electric machine, of a circuit-breaker for regulating the generative capacity of the machine and means controlled by the current for varying the proportion of make and break, substantially as set forth.

2. The combination, with a dynamo or magneto electric machine, of a revolving circuit-breaking cylinder having a surface of tapered insulating material and metal, a movable brush or spring, and a mechanism controlled by the current and adjusting said movable brush or spring upon the breaking-cylinder, for regulating the generative capacity of the machine, substantially as set forth.

3. The combination, with a dynamo or magneto electric machine, of a revolving circuit-breaking cylinder located in the field-circuit and having a surface of tapered insulating material and metal, a movable brush or spring, oppositely-working electro-magnets for adjusting said movable brush or spring, and a controlling device arranged in multiple arc, substantially as set forth.

4. The combination, with a dynamo or magneto electric machine, of a revolving circuit-breaking cylinder located in the field-circuit of the machine and having a surface of tapered insulating material and metal, an adjustable brush or spring, a pivoted bar for adjusting such brush or spring, two electro-magnets acting oppositely and separately upon such bar, means located in multiple-arc for controlling the circuits to said electro-magnets, and one or more dash-pots for retarding the movement, substantially as set forth.

This specification signed and witnessed this 7th day of July, 1882.

THOMAS A. EDISON.

Witnesses:
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